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The Patient-Experience Gap in Supplement Education: A Future-Ready Needs Assessment in Jakarta and West Java

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Abstract:
Background: Supplement use is common, but education may omit patient context, interaction screening, adverse effects, and follow-up. This study mapped these needs for a future-ready community-pharmacy and primary-care model. Methods: An exploratory cross-sectional needs assessment included 60 adults in Jakarta and West Java, Indonesia, on 25–26 August 2026. The questionnaire assessed supplement use, safety practices, confidence, patient experience, digital behaviour, and delivery preferences. We summarised frequencies, means, exploratory internal consistency, and Spearman correlations; population inference and causal testing were not intended. Results: Thirty-five (58.3%) used ≥2 supplements; 27 (45.0%) reported a side effect or uncertainty. Risk behaviours included similar-product use (50.0%), long-term use without reassessment (47.5%), and self-increasing the dose (40.0%). Exploratory means were 4.46/5 for patient experience, 4.36 for confidence, and 4.23 for digital readiness; unmet needs were indication/need (56.7%), product selection (65.0%), and adverse effects/red flags (46.7%). Pharmacy counselling, chat/WhatsApp, short video, reminders, and benefit/complaint check-ins were preferred. Conclusion: In this small nonprobability sample, findings suggest a human-led blended pathway using personalised counselling, teach-back, official digital microlearning, and lightweight follow-up. This preliminary blueprint requires co-design, prototype validation, and intervention evaluation.

Introduction (مقدمة)

Dietary and health supplements have become a durable component of self-care. Population surveillance has documented sustained supplement use across adult groups, while recent reviews describe a rapidly changing market that spans vitamins, minerals, botanicals, performance products, and products promoted through digital channels (Djaoudene et al., 2023; Kantor et al., 2016). The practical challenge is therefore not simply whether people use supplements, but whether they can make context-sensitive decisions about indication, product selection, dose, duration, and stopping. Clinical guidance also cautions against treating routine vitamin and mineral use as automatically beneficial for every person (Manson & Bassuk, 2018). Recent work shows that users' motivations and information behaviours are shaped by perceived benefit, social influence, and trust in information sources, while pharmacy and industry stakeholders report the need for better public-facing information (Janzik et al., 2025; Yumrukaya et al., 2024).

The safety case for structured education is substantial. Emergency-department visits have been associated with adverse events from dietary supplements, and herbal or dietary products have been implicated in clinically important liver injury (Geller et al., 2015; de Boer & Sherker, 2017; Navarro et al., 2017). Risks can be amplified when several products are combined with prescription medicines or when consumers infer that "natural" means risk-free. Unapproved pharmaceutical ingredients have also been detected in products linked to regulatory warnings (Tucker et al., 2018), and interaction concerns are particularly salient for weight-loss products and multi-ingredient formulations (Posadzki et al., 2013; Rivas García et al., 2024). In Indonesia, the regulatory framework specifies safety and quality requirements for health supplements, including product information that consumers and health professionals may use in counselling (Badan Pengawas Obat dan Makanan Republik Indonesia, 2023). These concerns align with the World Health Organization's patient-safety agenda, which treats patients and families as active partners in preventing avoidable harm (World Health Organization, 2021, 2024).

Community pharmacy is an important learning site because it combines access to products with opportunities for professional assessment. Good pharmacy practice positions pharmacists as providers of information and counselling, not merely as product dispensers (International Pharmaceutical Federation & World Health Organization, 2011). Evidence from Indonesia indicates that pharmacy workers may provide insufficiently appropriate advice when information gathering during the encounter is limited (Brata et al., 2019). Indonesian pharmacy research further identifies structural, organisational, and professional barriers that shape counselling practice, while community education initiatives demonstrate the potential of pharmacists and active learning tools to improve responsible self-medication literacy (Hermansyah et al., 2016, 2017, 2018a, 2018b; Setiadi et al., 2020, 2022). Recent patient-reported measurement work in community pharmacy likewise shows that service quality is multidimensional and includes communication, responsiveness, privacy, involvement, and continuity rather than a single satisfaction judgement (Carter et al., 2021, 2022). A supplement-education model should therefore be designed around the realities of brief, variable, and sometimes digitally mediated encounters.

Patient experience provides a useful lens for this design problem. Patient experience is related to, but not interchangeable with, satisfaction: systematic evidence links positive experiences with safety and effectiveness, while measurement research emphasises the need for reliable patient-reported experience measures and meaningful use of those measures in care (Doyle et al., 2013; Manary et al., 2013; Bull et al., 2019; Carfora et al., 2022). In pharmacy settings, service-quality measures include access, communication, responsiveness, privacy, involvement, and personalised support; lower perceived quality has been associated with poorer medication adherence (Carter et al., 2021, 2022; Grew et al., 2019). These dimensions are consistent with

shared decision making, in which the professional and patient combine evidence with patient goals and preferences (Elwyn et al., 2012). For supplement use, this means asking what the person is trying to achieve, what other products or medicines they use, and what would count as a reason to stop or seek care.

Digital information expands the learning environment but also raises a literacy and trust problem. eHealth literacy includes the ability to seek, understand, appraise, and apply health information in networked settings (Norman & Skinner, 2006; Neter & Brainin, 2012; van der Vaart & Drossaert, 2017). Health literacy is a social determinant rather than a purely individual skill, so education should reduce the cognitive and navigation burden placed on users (Sørensen et al., 2012; Nutbeam & Lloyd, 2021). Reviews have connected digital health literacy with health behaviours and have described sociodemographic variation in access and capability (Kim & Xie, 2017; Kim et al., 2023; Estrela et al., 2023). Search engines, video, and social media can increase reach, but they cannot substitute for source appraisal, tailored risk assessment, or a trusted professional relationship. Current evidence from primary care and pandemic-era settings similarly supports a model that combines digital resources with professional guidance (Dadaczynski et al., 2021; De Roza et al., 2025; Hua et al., 2025; Mackert et al., 2016).

This study is situated within futuristic teaching and learning because the desired output is not a static leaflet; it is an adaptive learning pathway that can move between human counselling, official digital content, teach-back, and follow-up. Design-based research (DBR) treats an educational intervention as an iterative object that is developed in context, tested, refined, and linked to theory (Wang & Hannafin, 2005; Tinoca et al., 2022). Health-intervention guidance likewise recommends identifying the problem, specifying the components and mechanisms, and evaluating implementation alongside outcomes (Skivington et al., 2021; Damschroder et al., 2022). Co-design can make that pathway more usable when patient experience and professional knowledge are brought together, but the evidence-to-design step must be explicit before co-design begins (Slattery et al., 2020; Peters et al., 2024; Vargas et al., 2022).

However, the relevant evidence remains fragmented. Recent supplement studies describe users' motivations, information behaviour, and interaction concerns (Janzik et al., 2025; Rivas García et al., 2024), while digital-health research shows that literacy and access vary across social and clinical contexts (Estrela et al., 2023; De Roza et al., 2025; Hua et al., 2025). Education research suggests that teach-back, short video, and spaced digital learning can support understanding and retention, but only when they are connected to an explicit learning task, feedback, and a human escalation route (Shersher et al., 2021; Martinengo et al., 2024; Morgado et al., 2024). What is less clear is how these strands can be translated into a locally grounded patient-education pathway that is feasible at the point of supplement use and responsive to community-pharmacy service constraints.

The gap addressed here is therefore the limited localized evidence that joins supplement-related safety practices, patient-reported experience, digital information behaviour, and preferred education formats into a single design brief for community and primary care learning. This study aimed to: (1) describe recent supplement use and self-reported safety-related practices; (2) characterise participants' experience of supplement education and their unmet information needs; and (3) translate digital behaviour, trust, barriers, and preferences into requirements for a future-ready patient-education model. The novelty is an evidence-to-design matrix that treats the patient-experience gap as a learning-design problem: what must be taught, how it should be experienced, where it should be delivered, and how continuity should be maintained. The matrix is a design proposition to be validated in later design-based research (DBR) cycles, not an evaluated intervention or a population estimate.

Design and setting

Method (منهج)

A descriptive cross-sectional online survey was conducted on 25–26 August 2026 among adults residing in DKI Jakarta or West Java, Indonesia. The survey formed the needs-assessment phase of a broader research-and-development project that is intended to develop and evaluate patient-experience-oriented pharmacy education. At the time of the survey, no educational prototype or intervention had been delivered. The study was reported with reference to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) principles (von Elm et al., 2007).

Participants and data source

Eligible participants were adults who provided informed consent, confirmed that they understood the participant-facing definition of a health supplement, and reported using at least one supplement during the preceding 30 days. The analysis used 60 eligible records. Two spreadsheet exports from the study instrument were identical in structure; they were merged, checked by the unique response identifier, and found to contain 60 unique records with no duplicate identifiers. The collection window in the merged data ranged from 25 August 2026 at 23:08:04 to 26 August 2026 at 08:26:06. Because the dataset is an available respondent sample rather than a probability sample, estimates are descriptive and should not be interpreted as population prevalence.

Instrument and measures

The researcher-developed questionnaire was derived from the approved study proposal and organised into screening and demographic questions; supplement-use history; reported practices (R01, 15 items); confidence in managing supplement use (R02, 10 items); education exposure and perceived impact; patient-experience items (P02, 11 items); digital information behaviour and readiness (L03, 10 items); service preferences; family involvement; and open-text comments. Most scaled responses used five ordered categories. Multiple-response questions allowed participants to select more than one topic, source, barrier, channel, or follow-up option.

The P02 block was aligned to patient-reported experience domains including access, responsiveness, time, listening, empathy, understandable language, tailoring, involvement, privacy, checking understanding, and follow-up. The R01 block included both positive safety practices and risk-oriented behaviours. For an exploratory safety profile only, self-increasing the dose, using several similar products, and continuing long-term use without reassessment were reverse-scored; higher plotted values therefore indicate a safer response. One L03 item concerning influence from nonprofessional online sources was also reverse-scored for an exploratory digital-readiness summary. These indices were constructed to organise the needs assessment and are not validated clinical, behavioural, or psychometric instruments.

Data processing and analysis

Text responses were normalised for whitespace and punctuation. Blank cells in multiple-response blocks were treated as unselected, while "not applicable," "not using," and equivalent responses in scaled blocks were treated as missing. No participant-level values were imputed. Frequencies and percentages were calculated with N = 60 unless an available-case denominator is shown. For 1–5 items, means, standard deviations, medians, and ranges were calculated using available responses. Exploratory internal-consistency estimates used Cronbach's alpha; they are reported as descriptive diagnostics because the questionnaire was not validated. The P02, R02, and L03 index means were 4.459, 4.355, and 4.232, respectively, while the reverse-scored R01 index mean was 4.085.

Wilson 95% confidence intervals were calculated for binary or multiple-response proportions as an uncertainty aid, although the small, nonprobability sample limits their inferential meaning. Spearman rank correlations were used for exploratory associations among

composite scores, with two-sided nominal p-values and no multiplicity adjustment. Correlations were not used to infer causality. Open-text responses were reviewed for recurring design-relevant ideas and used only as contextual illustration; they were not treated as a formal qualitative dataset and were not subjected to intercoder reliability analysis. Scale-development and reporting choices were interpreted in light of measurement guidance (Boateng et al., 2018; McNeish, 2018).

Ethics

The protocol received approval from the Research Ethics Committee of the Faculty of Health Sciences, Universitas Pembangunan Nasional "Veteran" Jakarta (Approval No. 209/VII/2026, issued 28 July 2026). Participation followed an informed-consent screen. The manuscript uses aggregated, de-identified survey data and does not report names, contact details, or participant-level responses.

Result (نتائج)

Dataset and participant profile

All 60 records met the survey's eligibility and consent conditions. Participants were predominantly male (60.0%), with a mean age of 29.85 years (SD = 5.99; median = 30; range = 18–46). Thirty-nine participants (65.0%) lived in DKI Jakarta and 21 (35.0%) in West Java. The sample was relatively highly educated and economically advantaged: 50.0% reported a bachelor's degree and 63.3% were classified in the upper socioeconomic category. Sixteen participants (26.7%) reported work in health care, supplement industry, sales, or marketing; the primary analysis retained them because the target education model is intended for the broader supplement-using public.

Table 1. Participant profile and recent supplement-use context (N = 60).

Characteristic	n (%) or summary
Sex — male	36 (60.0%)
Sex — female	24 (40.0%)
Age, years	M = 29.85; SD = 5.99; median 30; range 18–46
Residence — DKI Jakarta	39 (65.0%)
Residence — West Java	21 (35.0%)
Socioeconomic category — upper	38 (63.3%)
Socioeconomic category — middle	15 (25.0%)
Socioeconomic category — lower	7 (11.7%)
Education — bachelor's degree	30 (50.0%)
Education — high school/equivalent	25 (41.7%)
Education — diploma	2 (3.3%)
Education — graduate/professional	3 (5.0%)
Occupation — permanent employee	34 (56.7%)
Occupation — self-employed	16 (26.7%)
Regular prescription medicines — none	21 (35.0%)

Characteristic	n (%) or summary
Regular prescription medicines — 1 type	17 (28.3%)
Regular prescription medicines — 2–4 types	22 (36.7%)
Supplements used in past 30 days — 1 type	25 (41.7%)
Supplements used in past 30 days — 2 types	18 (30.0%)
Supplements used in past 30 days — 3–4 types	17 (28.3%)

Percentages may not sum to 100% because of rounding. The supplement and prescription-medicine categories are mutually exclusive within their respective questions.

Supplement use and safety-related signals

Multi-product exposure was common: 35 participants (58.3%) reported using at least two supplement types during the preceding 30 days, while 39 (65.0%) reported taking at least one regular prescription medicine. The most common purposes were immunity (45.0%) and health or fitness (40.0%). The final decision to use a product was made by the participant in 65.0% of cases, although the first source of discovery was a doctor for 25.0%, social media or an influencer for 18.3%, a friend or workmate for 13.3%, and a pharmacist for 13.3%. The most recent purchase occurred in a pharmacy for 51.7% of respondents, with e-commerce accounting for 13.3%.

Table 2. Selected supplement-use and safety-related signals.

Signal	n/N	%	Design interpretation
At least two supplements used in past 30 days	35/60	58.3%	Multi-product exposure was common.
At least one regular prescription medicine	39/60	65.0%	A potential interaction-screening context was present.
Side effect once, more than once, or unsure	27/60	45.0%	A self-reported safety signal or uncertainty was present.
Always consult about interactions with regular medicines	16/60	26.7%	Only about one quarter reported doing this routinely.
Self-increased dose often or always	24/60	40.0%	Unsupervised dose escalation was reported.
Used several similar products often or always	30/60	50.0%	Potential duplication was reported by half.
Continued long-term use without reassessment often or always	28/59	47.5%	Duration and review were frequent blind spots.

Risk-behaviour percentages are raw response prevalences and do not establish clinical harm or irrational use. The long-term-use item had one not-applicable/missing response.

The pattern was not uniformly low or high. Participants reported strong label-reading (M = 4.73), product-registration checking (M = 4.72), dose following (M = 4.60), and seeking information about interactions and adverse effects (M = 4.57 and 4.58). At the same time, the three risk-oriented behaviours remained substantially weaker after reverse-scoring: avoiding similar products (M = 2.90), reassessing long-term use (M = 2.85), and avoiding self-increased dosing (M = 3.27). The result is best described as a dual-track profile or confidence–practice gap, not as a clinical diagnosis of irrational use. Figure 2 displays the full exploratory item profile.

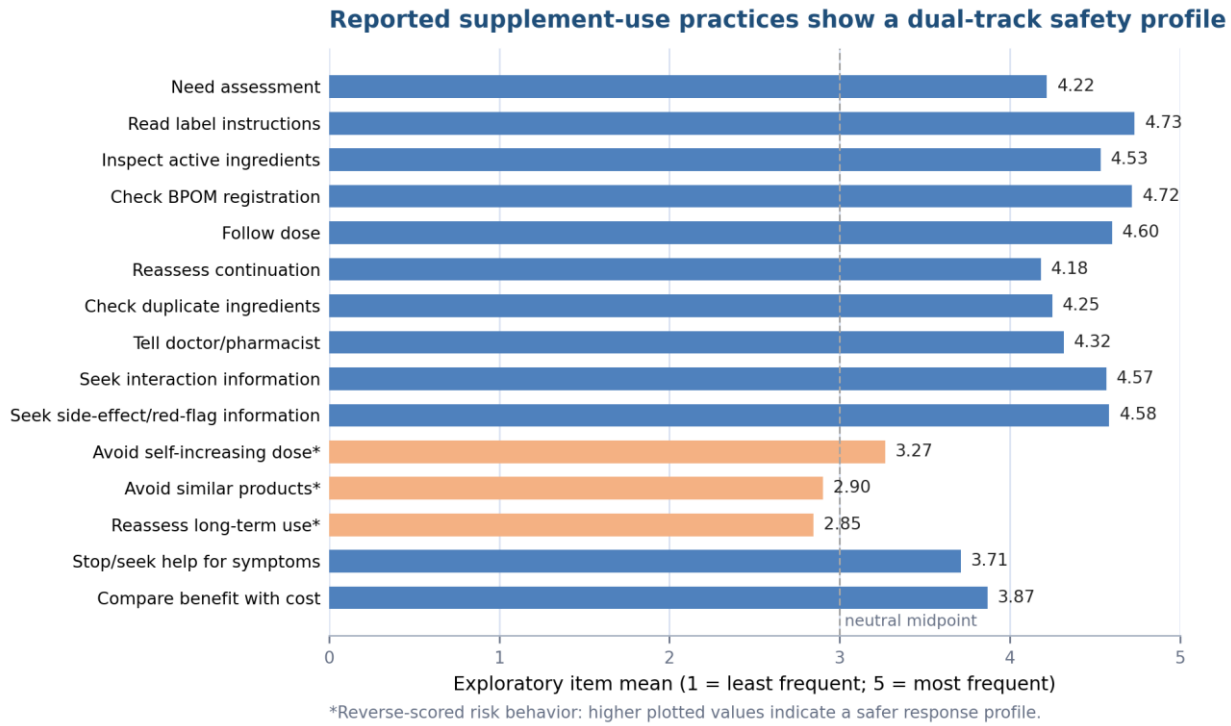

Figure 2. Exploratory profile of reported supplement-use practices. Blue bars are direct safety-practice items; orange bars are reverse-scored risk behaviours. Higher values indicate more frequent direct practice or a safer reverse-scored response.

Education exposure, patient experience, and unmet topics

Professional education was present but uneven in topic coverage. In the preceding 12 months, 43.3% recalled a special supplement explanation from a pharmacist, 36.7% from a doctor, and 13.3% from another health professional; one participant reported never receiving such an explanation. Direct conversation was the most common format ever received (78.3%), followed by telephone/chat/video consultation (36.7%) and information on the label or package (31.7%). The perceived impact of prior education was favourable (M = 4.03, SD = 1.06), as was information adequacy (M = 4.27, SD = 0.88), but these favourable global ratings coexisted with topic-specific omissions.

Table 3. Patient-experience items aligned with the survey's P02 block.

Experience domain	n	Mean (SD)
Access to ask or consult	60	4.42 (0.65)
Response to questions	59	4.56 (0.53)
Enough time	59	4.49 (0.54)
Listens to concerns and goals	59	4.44 (0.62)
Friendly and empathetic	59	4.54 (0.57)
Uses understandable language	59	4.44 (0.53)
Tailors to age, condition, medicines, and needs	59	4.59 (0.56)
Involves the patient in decisions	59	4.44 (0.60)
Provides privacy and comfort	59	4.48 (0.60)
Checks understanding	59	4.51 (0.57)
Provides follow-up directions	59	4.56 (0.57)

Experience domain	n	Mean (SD)
Exploratory patient-experience index	60	4.46 (0.53); α = .915

Items used a 1–5 response scale. The index is an exploratory summary of a researcher-developed block and should not be interpreted as a validated PREM score.

The topic crosswalk showed the clearest gaps between what participants recalled having been explained and what they said they needed. Indication or need was previously explained to 21.7% but currently needed by 56.7% (+35.0 percentage points). Product selection showed a +21.7-point gap (43.3% versus 65.0%), adverse effects or red flags a +13.4-point gap (33.3% versus 46.7%), and duration or when to stop a +13.3-point gap (6.7% versus 20.0%). Interaction education doubled from 10.0% ever explained to 20.0% needed. Ingredients/function and dose/timing were the only high-coverage areas, with smaller needs gaps. Figure 3 presents the complete crosswalk.

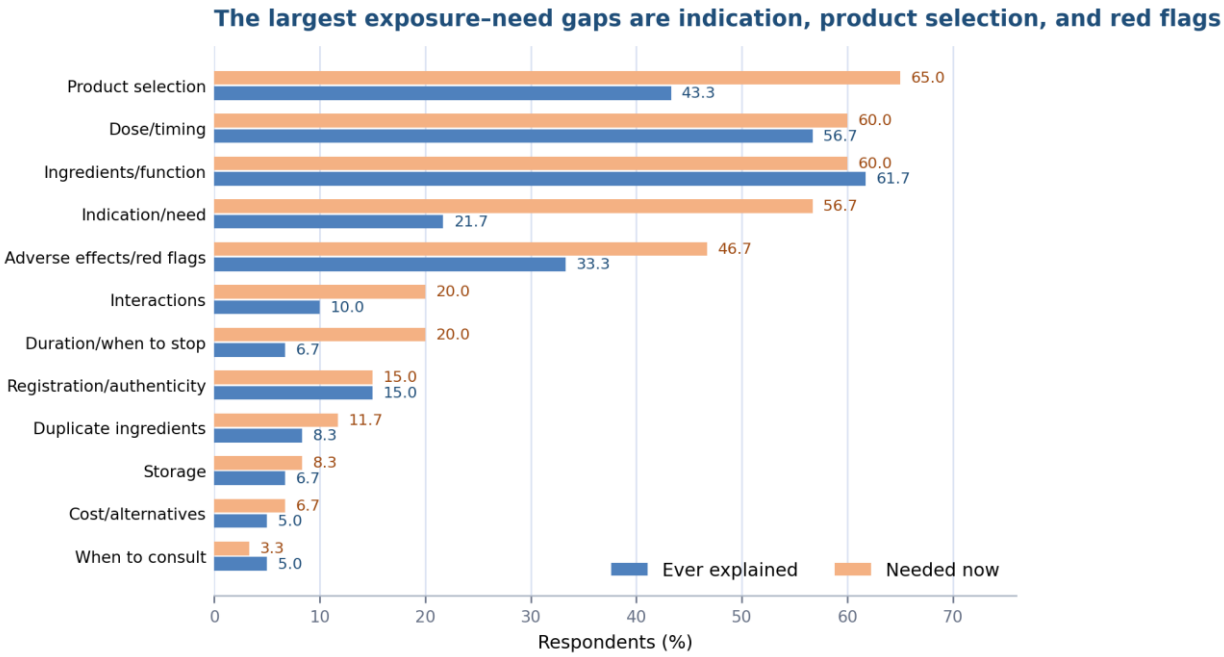

Figure 3. Exposure–need crosswalk for supplement-education topics (N = 60). The two blocks were explicitly paired by topic construct rather than by spreadsheet column position.

Digital information behaviour and preferred learning architecture

Digital information seeking was universal in the response set: no participant selected the option indicating no use of digital media for supplement information. Google or another search engine was used by 73.3%, official government/BPOM/Ministry of Health sources by 60.0%, YouTube by 46.7%, facility or pharmacy websites by 45.0%, TikTok by 38.3%, and Instagram by 36.7%. Trust remained professional and institutional: doctors were trusted by 80.0%, pharmacists by 70.0%, other health professionals by 50.0%, and BPOM or the Ministry of Health by 40.0%, while only 1.7% selected an influencer as a trusted source. When internet information differed from professional advice, 48.3% followed the doctor or pharmacist, 18.3% compared with official or other sources, 15.0% asked again, and 13.3% followed internet or social-media information.

The main barriers were time (35.0%), no pharmacist or staff available (30.0%), consultation cost (30.0%), staff appearing busy (28.3%), distance or transport (21.7%), privacy (20.0%), and overly technical language (20.0%). Participants preferred a doctor as the primary educator (56.7%), followed by a pharmacist (23.3%), collaboration between health professionals (11.7%),

and a nutritionist (8.3%). Direct pharmacy consultation was the most preferred channel (68.3%), followed by direct puskesmas consultation (50.0%), chat/WhatsApp (40.0%), short video and official social media (30.0% each), and phone/video consultation (25.0%). A direct interaction lasting 11–20 minutes was preferred by 63.3%. For continuity, participants most often selected a use reminder (55.0%) and a message to assess benefit or complaints (50.0%). These choices support blended continuity rather than digital replacement of professional contact (Figure 4).

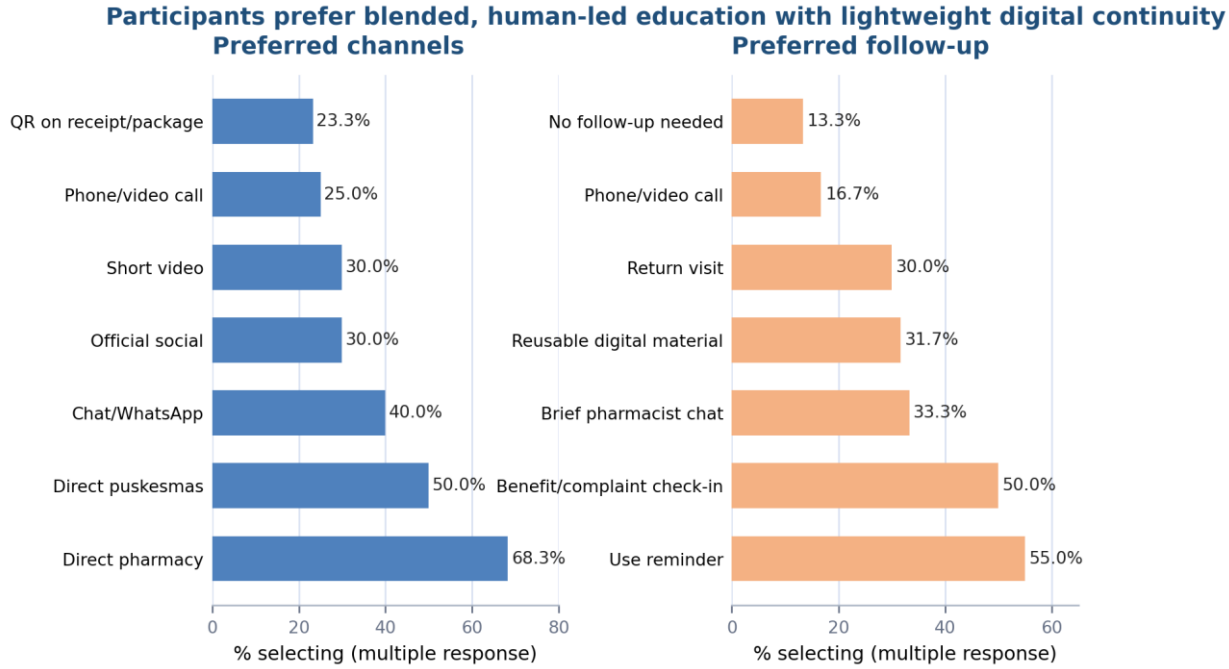

Figure 4. Preferred channels and follow-up options. Percentages are based on multiple-response questions; selections therefore do not sum to 100%.

The exploratory digital-readiness index was high (M = 4.23, SD = 0.35; α = .726), as was confidence in managing supplement use (M = 4.36, SD = 0.57; α = .895). Higher confidence showed a modest positive association with the exploratory safer-practice profile (Spearman ρ = .365, p = .004), and digital readiness was positively associated with perceived education impact (ρ = .337, p = .009). These are nominal, unadjusted associations and should be treated as hypotheses for the next study cycle. The pattern was directionally similar when the 16 health- or supplement-related workers were excluded: the exploratory rational-practice mean was 4.15 among 44 other respondents versus 3.91 among the 16 related workers.

Discussion (مناقشة)

A needs assessment reveals a confidence–practice gap

The central finding in this exploratory needs assessment is a mismatch between what respondents said they could or did do in principle and the safety behaviours that require active review over time. Label reading, ingredient inspection, registration checking, dose following, and seeking interaction or adverse-effect information received high direct-item ratings. Yet 40.0% reported self-increasing a dose often or always, 50.0% reported using several similar products often or always, and 47.5% reported continuing long-term use without reassessment often or always. These findings do not prove that a respondent used a harmful product or experienced a clinical event. They do show that a future education model cannot rely on general confidence, a registration check, or a one-time explanation as proxies for safe use.

One possible explanation is that respondents found visible, checklist-like actions easier to report than cumulative or time-dependent decisions. Reading a label or checking registration can be completed at a single moment, whereas avoiding duplicate ingredients, reviewing duration, and deciding whether a perceived benefit justifies continued use require comparison across products and reflection on changing goals. This interpretation is consistent with recent evidence that supplement use is shaped by perceived benefits, social influence, and trust in information sources (Janzik et al., 2025), and with interaction literature showing that risk depends on the combination of ingredient, dose, duration, co-use, and user context rather than on a product category alone (Posadzki et al., 2013; Rivas García et al., 2024). It should be treated as a plausible design hypothesis, not as an explanation proven by this cross-sectional dataset.

The pattern is consistent with the known complexity of supplement safety. Product risk is shaped by ingredients, dose, duration, co-use, underlying conditions, and the quality of the information used to make a decision (Geller et al., 2015; Navarro et al., 2017; Posadzki et al., 2013). It also resembles a familiar problem in medication use: information must be gathered before advice can be tailored. Indonesian community-pharmacy research has found that insufficient information gathering can undermine the appropriateness of advice even when staff may possess relevant knowledge (Brata et al., 2019). The implication for the present project is a shift from "deliver supplement information" to "teach and verify a safety reasoning sequence": purpose, product, ingredients, dose, duration, other medicines/products, warning signs, and next action. This interpretation also helps explain why the present risk signals should be compared with, rather than generalized beyond, prior supplement-safety studies: the current survey did not verify ingredients, adjudicate adverse events, or estimate clinical risk.

The modest confidence–practice association should be interpreted carefully. Confidence may support action, but it may also be inflated by familiarity, positive expectations, or the ability to report socially desirable behaviour. The questionnaire was researcher-developed and the rational-practice index had only modest internal consistency ($\alpha = .562$), which reinforces the decision to treat the index as a design diagnostic rather than a validated outcome. Future work should first refine item wording and response anchors, then test the instrument against product records, teach-back performance, or observed counselling outcomes. Scale development should follow a transparent content-validation and construct-validation process (Boateng et al., 2018; McNeish, 2018).

High reported experience does not eliminate service friction

Participants rated their education experience favourably across access, empathy, tailoring, understandable language, involvement, privacy, checking understanding, and follow-up directions. This is valuable evidence that a respectful encounter is possible, but it should not be read as evidence that access is frictionless or that all important topics were covered. Global experience ratings can coexist with omitted content: the exposure–need crosswalk showed large deficits in indication, product selection, red flags, duration, and interaction. Patient experience measures are most useful when they are connected to service improvement and when domains are interpreted as actionable components of care, not as a single satisfaction score (Bull et al., 2019; Shunmuga Sundaram et al., 2022).

The apparent coexistence of favourable experience ratings and topic-specific gaps may have several explanations. A respondent may remember a courteous, accessible interaction without being able to judge whether all clinically relevant questions were asked; conversely, a brief encounter may feel helpful while leaving product selection or duration review implicit. The online, available-respondent sample may also overrepresent people who are comfortable with health information or who recently had a positive encounter. This reading is compatible with community-pharmacy measurement studies that treat experience as a set of actionable service domains rather than a global endorsement (Carter et al., 2021, 2022; Grew et al., 2019). The present

result therefore argues for linking PREM-style feedback to a content checklist, not for interpreting the mean experience score as proof of comprehensive education.

The barriers give the high ratings a practical context. Time pressure, staff availability, consultation cost, perceived busyness, privacy, and technical language can all prevent a patient from asking a second question or disclosing concurrent medicines and products. This matters because pharmacy service quality is shaped by both interactional and organisational conditions, and patient experience has been associated with adherence and other outcomes in pharmacy care (Carter et al., 2021, 2022; Grew et al., 2019). The proposed model should therefore include an encounter-level checklist that is short enough for routine practice and a service-level plan that protects a private, recognisable consultation pathway. "No time" is not an education preference; it is a design constraint.

Teach-back is a particularly suitable bridge between experience and safety. It asks the patient to explain in their own words how they will use a product and what they will do if a concerning symptom occurs; it is not a test of the patient. Systematic reviews describe teach-back as a communication method with potential benefits for understanding, adherence, and self-management, while implementation research emphasises the need for operational training rather than a slogan (Dinh et al., 2016; Shersher et al., 2021; Talevski et al., 2020). Community health-worker training has also shown how structured teach-back curricula can be taught and evaluated in practice (Anderson et al., 2020; Holcomb et al., 2022). A supplement consultation could end with two or three prompts: "How will you take it?", "How long will you try it before reviewing the benefit?", and "What would make you stop and ask for help?"

Digital should extend, not replace, human counselling

The digital findings support a precise rather than celebratory view of digital learning. Search engines were the most common route to information, while official sources, facility websites, YouTube, TikTok, and Instagram formed a mixed information ecology. Participants trusted doctors, pharmacists, and government sources more than influencers, and most reported following professional advice when internet information conflicted with it. This creates an opportunity: professional education can provide a reliable "next click" that redirects search behaviour toward official, plain-language, and locally relevant content. It also creates a responsibility to make that content findable, current, accessible, and explicit about uncertainty.

The mixed information ecology is consistent with recent digital-health-literacy evidence: access to a device does not guarantee the ability to locate, appraise, and apply trustworthy health information, and digital capability varies by social and clinical context (Kim et al., 2023; Estrela et al., 2023; De Roza et al., 2025; Hua et al., 2025). It also explains why respondents could prefer both official sources and short social or video formats. The format may lower the effort needed to start learning, while trust and professional verification remain necessary for personalised risk decisions. Thus, the survey supports a complementary model rather than a technology-first conclusion.

Digital health literacy is more than the ability to operate a device. It involves locating, appraising, and applying information under real-world constraints, and it varies with social resources, health status, and the design of digital systems (Kim & Xie, 2017; Estrela et al., 2023; Hua et al., 2025). A digital resource that assumes unlimited time, stable connectivity, high reading fluency, and comfort with medical terminology can widen rather than narrow the gap (Mackert et al., 2016; De Roza et al., 2025). The present participants' low reported technology barrier should not be generalised to all users; universal precautions in health literacy recommend making communication clear and usable for everyone by default (Brach, 2024).

The preferred media pattern also suggests a learning architecture. Short video and official social content can provide an initial cue or explain one concept; a QR code can connect the purchase moment to an official module; chat or WhatsApp can support a question after the encounter; and direct counselling can resolve personalised risk. Evidence from health-professions

education indicates that digital and online formats can be effective when designed around interaction, feedback, and a clear learning task rather than content volume (Car et al., 2019; O'Doherty et al., 2018; Pei & Wu, 2019; Regmi & Jones, 2020). Spaced digital learning may also support retention when short learning episodes are revisited over time (Martinengo et al., 2024). Microlearning and video can support engagement and recall, but the content must still be accurate, captioned, and linked to a human escalation route (De Gagne et al., 2019; Guo et al., 2014; Knapp et al., 2022; Morgado et al., 2024).

An evidence-to-design blueprint for future-ready learning

The survey can be translated into four design requirements. First, the core lesson should be safety-first and decision-centred: indication/need, product selection, ingredients/function, dose/timing, duration, interactions, duplicate ingredients, adverse effects/red flags, registration/authenticity, and when to seek help. The prioritisation follows the largest exposure–need gaps rather than an assumption that participants need more generic supplement facts, and it can be organised as a behaviour-change sequence rather than a list of facts (Michie et al., 2011). Second, the learning experience should be human-led and personalised. A trained pharmacist, doctor, or coordinated health team should ask about goals, medicines, other products, and previous symptoms, use plain language, invite questions, and verify understanding. This is compatible with Indonesian community education evidence that emphasises pharmacists, relevant training aids, and active learning arrangements (Setiadi et al., 2020, 2022).

Third, digital content should be modular and connected to the care pathway. A QR-linked micro-module could contain a product/ingredient checklist, a short captioned video on duplication and dose escalation, an official registration link, and a "when to ask" prompt. The design should work as a standalone refresher but should not imply that an algorithm can decide suitability without context. Fourth, continuity should be lightweight and purposeful: a reminder to use as directed, a check-in about benefit or complaints, a route to chat with a pharmacist, and a clear referral instruction. Follow-up should be an opportunity to reassess, not an automated marketing channel.

Table 4. Evidence-to-design matrix for the next DBR cycle.

Survey signal	Learning requirement	Proposed prototype element
Indication, selection, red flags, duration, interactions, duplication	Safety-first decision lesson; prioritise the largest exposure–need gaps	Brief checklist; plain-language micro-module; registration and referral links; teach-back prompts
High experience ratings but time, availability, privacy, and language barriers	Make the encounter recognisable, private, tailored, and feasible in 11–20 minutes	Pharmacy/puskesmas counselling slot; structured opening questions; shared decision and teach-back
Search engines and official sources dominate; video/social channels are used	Create a findable, authoritative, multimodal digital extension	QR at point of purchase; captioned short video; official webpage; low-bandwidth reusable material
Reminders and benefit/complaint check-ins are preferred	Close the learning loop and detect the need for review or referral	WhatsApp/chat reminder; benefit and adverse-effect check-in; escalation to pharmacist/doctor

This matrix is a design proposition derived from the cross-sectional needs assessment. It has not yet been co-designed, validated, or tested for effectiveness.

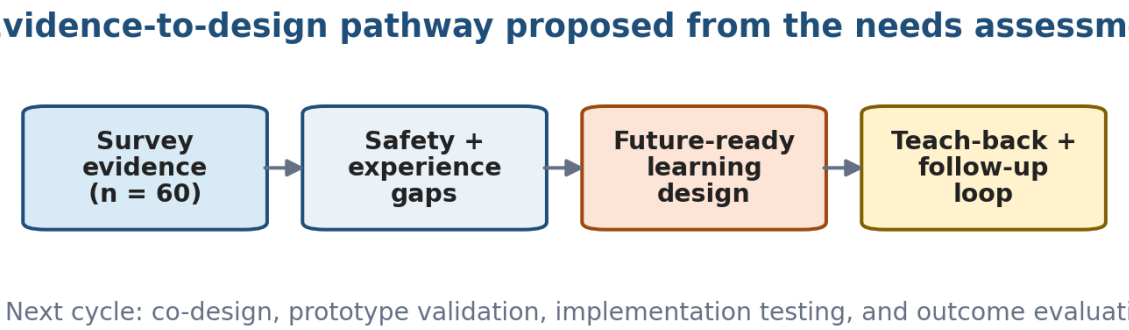

Figure 1. Proposed evidence-to-design pathway. The next cycle should co-design and validate the prototype, assess implementation, and then evaluate patient and service outcomes; the present study does not evaluate the intervention.

Implications for Futuristic Teaching and Learning

For the journal's futuristic teaching-and-learning agenda, the contribution is a patient-education case in which "future-ready" means adaptive, blended, feedback-rich, and accountable. It does not mean replacing the professional with a chatbot or converting counselling into a content library. The health workforce literature has argued for education that combines clinical reasoning, digital capability, interprofessional collaboration, and responsiveness to changing systems (Frenk et al., 2010). In medical education, artificial intelligence can support personalisation and simulation, but its implementation raises challenges around data quality, bias, governance, and the role of the educator (Masters, 2019; Chan & Zary, 2019; Wartman & Combs, 2019). Those lessons apply here: any future recommendation engine would need transparent source provenance, a safe uncertainty boundary, human oversight, and a referral trigger.

The DBR sequence should begin with stakeholder co-design involving supplement users, pharmacists, doctors, primary-care staff, and—where appropriate—family members. Co-design should not be used as a decorative consultation; it should test whether the proposed learning tasks, language, channel, timing, and follow-up are feasible and acceptable (Peters et al., 2024; Slattery et al., 2020; Vargas et al., 2022). Subsequent cycles can test prototype usability, teach-back performance, fidelity of the counselling checklist, reach of digital modules, and implementation outcomes such as adoption, appropriateness, feasibility, and sustainability (Damschroder et al., 2022; Greenhalgh et al., 2017; Nilsen, 2015; Proctor et al., 2011). A later quasi-experimental evaluation should use refined measures and, where possible, verify changes in duplicate-product use, dose escalation, review of long-term use, interaction disclosure, and appropriate referral.

Limitations

Several limitations constrain interpretation. The sample was small, nonprobability, and concentrated in DKI Jakarta and West Java; it was also relatively educated and economically advantaged, so percentages cannot be treated as prevalence estimates for Indonesia. Data were collected in a two-day window and may reflect the networks reached by the online survey. All practice, experience, and adverse-effect measures were self-reported and may be affected by recall and social-desirability bias. The study did not inspect product packaging, verify registration, adjudicate adverse events, or measure clinical outcomes. The questionnaire was researcher-developed, and exploratory alphas—especially for the rational-practice block—do not establish validity. Multiple-response topic comparisons depend on participants' recall and on the survey's construct crosswalk. Finally, the correlations were nominal, unadjusted, and exploratory; the cross-sectional design cannot establish that education, confidence, or digital readiness causes safer behaviour. These limitations are precisely why the findings are positioned as requirements for DBR rather than as evidence of intervention effectiveness.

Conclusion (خاتمة)

Within this small, nonprobability needs assessment of 60 recent supplement users in Jakarta and West Java, reported confidence and patient-experience ratings coexisted with important gaps in indication, product selection, adverse-effect recognition, interaction screening, duration review, and avoidance of duplicate or self-escalated use. Participants preferred direct, trusted professional contact supported by chat/WhatsApp, short official digital content, reminders, and benefit/complaint check-ins. On that basis, the study proposes a human-led blended learning pathway: a brief personalised safety conversation, teach-back, findable official microlearning, and purposeful follow-up. This pathway is a blueprint derived from the needs assessment, not an implemented or validated educational intervention. It should be treated as a design proposition requiring stakeholder co-design, measurement refinement, prototype validation, implementation assessment, and comparative evaluation before any claim about effectiveness, generalisability, or rational supplement use is made.

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Data availability: The de-identified participant-level dataset is not publicly posted because it contains survey responses. Aggregated analytic summaries are provided in this manuscript; reasonable data-access requests may be directed through the corresponding author and will be considered subject to ethics and privacy restrictions.

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